

CLAIMS

1. An apparatus for text entry comprising:

5 a joystick member user input device having at least P number of motions, each of which is associated with a signal representing one of P predefined stroke categories;

a processor coupled to said joystick member;

at least one memory coupled to said processor, said at least one memory containing at least one database and at least one program used by said processor to process data, said at least one database comprising a number of characters and data of stroke order necessary for each of the characters as well as data of use frequency associated with each of the characters, said stroke order based on said predefined stroke categories; and

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an output member coupled to said processor, said output member comprising a text display area and a selection list display area;

15 wherein said at least one program causes said processor to:

identify a stroke input signal representative of one of said stroke categories, said stroke input signal being associated with a predefined motion of said joystick member;

display a first selection list when a first stroke is identified, said first selection list comprising first Q number of most frequently used characters that start with said first stroke;

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if the user chooses to enter any character from said first selection list, display said chosen character in said text display area; otherwise,

display a second selection list when a second stroke is identified, said second selection list comprising first Q number of most frequently used characters that start with said first stroke followed by said second stroke;

5 if the user chooses to enter any character from said second selection list, display said chosen character in said text display area; otherwise,

display a third selection list when a third stroke is identified, said third selection list comprising first Q number of most frequently used characters that start with said first stroke followed by said second stroke and then followed by said third stroke;

10 if the user chooses to enter any character in said third selection list, display said chosen character in said text display area; otherwise,

continue to display a next selection list corresponding to a next stroke added until the user chooses to enter any character from said next selection list; and

repeat the process for entering a next character.

2. The apparatus of Claim 1, wherein said P number is five.

15 3. The apparatus of Claim 2, wherein said five predefined stroke categories are horizontal stroke, vertical stroke, left falling stroke, right falling stroke, and any stroke other than the first four categories.

4. The apparatus of Claim 1, wherein said Q number is ten.

20 5. The apparatus of Claim 1, wherein said joystick member comprises at least one motion representing a signal for selecting a character from any of said selection list.

6. The apparatus of Claim 1, wherein said joystick member comprises at least one motion representing a signal for entering a chosen character into said text display area.

7. The apparatus of Claim 1, wherein said joystick member comprises at least one motion representing a signal for deleting a character entered.

8. The apparatus of Claim 1, wherein said joystick member enables the user to define at least one or more motion representing a task executable by said processor.

5 9. The apparatus of Claim 1, wherein said joystick member is an isometric joystick incorporated therein.

10. The apparatus of Claim 1, wherein said at least one program further causes said processor to:

10 move a visual cue over a desired character in any of said selection list for selecting the desired character in response to a signal representing the user's action to select the desired character, said action to select being either a button pressing or a predefined motion of said joystick member; and

15 put the selected character in said text display area in response to a signal representing the user's action to enter the selected character, said action to enter being either a button pressing or a predefined motion of said joystick member.

11. The apparatus of Claim 10, wherein said visual cue is a bitmap in any shape and in any size not larger than the space of a character displayed in said selection list display area.

20 12. The apparatus of Claim 10, wherein said at least one program further causes said processor to:

automatically select the first character in any of said selection list.

13. The apparatus of Claim 1, wherein said at least one program further causes said processor to:

display a default selection list before any stroke input signal is identified or after a punctuation mark or a character is entered, said default selection list comprising the first R number of most frequently used characters.

14. The apparatus of Claim 13, wherein said at least one database further comprises data of frequency of each character in said default selection list being used as the first character of a sentence or half-sentence, and wherein before any stroke signal is identified or after a punctuation mark is entered, said at least one program causes said processor to:

display said default selection list in a first default sequence which is based on frequency of each character in said default selection list being used as the first character of a sentence or half-sentence.

15. The apparatus of Claim 13, wherein said at least one database further comprises a number of multi-character words and phrases and data of use frequency associated with each of the multi-character words and phrases, wherein after a character is entered, said at least one program causes said processor to:

append each character in said default selection list to said entered character to make a two-character combination;

check each two-character combination against said at least one database;

if no word or phrase whose first two characters matches each two-character combination is found, display said default selection list in a second default sequence which is based on use frequency of each character in said default selection list; and

if some words or phrases whose first two characters matches said two-character combination are found, display said default selection list in a sequence determined by:

prioritizing a matching character whose corresponding two-character combination has matching words or phrases over a non-matching character whose corresponding two-character combination has no matching words or phrases;

5 prioritizing all matching characters based on use frequency of each corresponding matching word or phrase; and

prioritizing all non-matching characters based on use frequency of each non-matching character.

16. The apparatus of Claim 13, wherein said R number is ten.

10 17. The apparatus of Claim 1, wherein said at least one database further causes said processor to:

before any stroke input signal is identified or immediately after a punctuation mark is entered, display a first default selection list which comprises the ten characters that are most frequently used as the first character of a sentence or a half-sentence in a sequence based on use frequency;

15 after a character is entered and before a next stroke input signal is identified, display a second default selection list which comprises the first ten most frequently used characters, the sequence of which being based on:

use frequency of each character in the second default list, if no contextual relationship between the character entered and any character in the second default list
20 can be established, or

contextual association value of each character in the second default list.

18. The apparatus of Claim 1, wherein said at least one database further comprises a number of multi-character words or phrases and data of use frequency associated with

each of the multi-character words or phrases, wherein in response to a stroke input signal representing a stroke added, said at least one program causes said processor to:

5 obtain a character list comprising first Q number of most frequently used characters that satisfy the stroke ordinal number and the corresponding stroke category of said stroke added, and the stroke ordinal numbers and the corresponding stroke categories of all strokes previously added;

append each character in said character list to the last character entered to make a two-character combination;

check each two-character combination against said at least one database;

10 if no word or phrase whose first two characters matches said two-character combination is found, display said character list as a selection list in a sequence based on use frequency of each character in said character list; and

15 if some words or phrases whose first two characters matches said two-character combination are found, display said character list as a selection list in a sequence determined by:

prioritizing a matching character whose corresponding two-character combination has matching words or phrases over a non-matching character whose corresponding two-character combination has no matching words or phrases;

20 prioritizing all matching characters based on use frequency of each corresponding matching word or phrase; and

prioritizing all non-matching characters based on use frequency of each non-matching character.

19. The apparatus of Claim 1, wherein said at least one program further causes the processor to:

concurrently with a stroke input signal being identified, display a numeric or iconic representation of the stroke represented by said stroke input signal; and

5 concurrently with a character being entered in said text display area, display a numeric or iconic representation of said character entered.

20. A method for text entry comprising the steps of:

identifying a stroke input signal representative of one of five predefined stroke categories, said stroke input signal being associated with a predefined motion of a joystick used an input device coupled to a processor which is further coupled to a database and a display device;

as soon as a first stroke for a character is identified, displaying a first selection list in a selection list display area of the display device, said first selection list comprising ten most frequently used characters that start with said first stroke;

15 if the user chooses to enter any character from said first selection list, displaying said chosen character in a text display area of the display device; otherwise,

displaying a second selection list when a second stroke is identified, said second selection list comprising ten most frequently used characters that start with said first stroke followed by said second stroke;

20 if the user chooses to enter any character from said second selection list, displaying said chosen character in said text display area; otherwise,

displaying a third selection list when a third stroke is identified, said third selection list comprising ten most frequently used characters that start with said first stroke followed by said second stroke and then followed by said third stroke;

5 if the user chooses to enter any character in said third selection list, displaying said chosen character in said text display area; otherwise,

continuing to display a next selection list corresponding to a next stroke added until the user chooses to enter any character from said next selection list; and

repeating above steps for entering a next character.

10 21. The method of Claim 20, wherein said five predefined stroke categories are horizontal stroke, vertical stroke, left falling stroke, right falling stroke, and any stroke other than the first four categories.

22. The method of Claim 20, wherein said joystick comprises at least one motion representing a signal for selecting a character from any of said selection list.

15 23. The method of Claim 20, wherein said joystick comprises at least one motion representing a signal for entering a chosen character into said text display area.

24. The method of Claim 20, wherein said joystick comprises at least one motion representing a signal for deleting a character entered.

25. The method of Claim 20, wherein said joystick enables the user to define at least one motion representing a task executable by the processor.

20 26. The method of Claim 20, wherein said joystick is an isometric joystick.

27. The method of Claim 20, further comprising the steps of:

moving a visual cue over a desired character in any of said selection list for selecting the desired character in response to a signal representing the user's action to select the desired character, said action to select being either a button pressing or a predefined motion of said joystick member; and

5 placing the selected character in said text display area in response to a signal representing the user's action to enter the selected character, said action to enter being either a button pressing or a predefined motion of said joystick member.

28. The method of Claim 27, wherein said visual cue is a bitmap in any shape and in any size not larger than the space of a character displayed in said selection list display
10 area.

29. The method of Claim 27, further comprising the step of:

automatically selecting the first character in any of said selection list.

30. The method of Claim 20, further comprising the step of:

15 displaying a default selection list before any stroke input signal is identified or after a punctuation mark or a character is entered, said default selection list comprising the first ten most frequently used characters.

31. The method of Claim 30, wherein before any stroke signal is identified or after a punctuation mark is entered, further comprising the step of:

20 displaying said default selection list in a first default sequence which is based on frequency of each character in said default selection list being used as the first character of a sentence or half-sentence.

32. The method of Claim 30, wherein immediately after a character is entered, further comprising the steps of:

appending each character in said default selection list to said entered character to make a two-character combination;

checking each two-character combination against the database;

5 if no word or phrase whose first two characters matches each two-character combination is found, displaying said default selection list in a second default sequence which is based on use frequency of each character in said default selection list; and

if some words or phrases whose first two characters matches said two-character combination are found, displaying said default selection list in a sequence determined by:

10 prioritizing a matching character whose corresponding two-character combination has matching words or phrases over a non-matching character whose corresponding two-character combination has no matching words or phrases;

prioritizing all matching characters based on use frequency of each corresponding matching word or phrase; and

15 prioritizing all non-matching characters based on use frequency of each non-matching character.

33. The method of Claim 20, further comprising the steps of:

20 before any stroke input signal is identified or immediately after a punctuation mark is entered, displaying a first default selection list which includes the ten characters that are most frequently used as the first character of a sentence or a half-sentence in a sequence based on use frequency;

after a character is entered and before a next stroke input signal is identified, displaying a second default selection list which includes the first ten most frequently used characters, the sequence of which being based on:

5 use frequency of each character in the second default list, if no contextual relationship between the character entered and any character in the second default list can be established, or

contextual association value of each character in the second default list.

34. The method of Claim 20, wherein in response to a stroke input signal representing a stroke added, further comprising the steps of:

10 obtaining a character list comprising ten most frequently used characters that satisfy the stroke ordinal number and the corresponding stroke category of said stroke added, and the stroke ordinal numbers and the corresponding stroke categories of all strokes previously added;

15 appending each character in said character list to the last character entered to make a two-character combination;

checking each two-character combination against said at least one database;

if no word or phrase whose first two characters matches said two-character combination is found, displaying said character list as a selection list in a sequence based on use frequency of each character in said character list; and

20 if some words or phrases whose first two characters matches said two-character combination are found, displaying said character list as a selection list in a sequence determined by:

prioritizing a matching character whose corresponding two-character combination has matching words or phrases over a non-matching character whose corresponding two-character combination has no matching words or phrases;

5 prioritizing all matching characters based on use frequency of each corresponding matching word or phrase; and

prioritizing all non-matching characters based on use frequency of each non-matching character.

35. The method of Claim 20, further comprising the steps of:

10 concurrently with a stroke input signal being identified, displaying a numeric or iconic representation of the stroke represented by said stroke input signal; and

concurrently with a character being entered in said text display area, displaying a numeric or iconic representation of said character entered.

15 36. A computer usable medium containing instructions in computer readable form for carrying out a process for Chinese text entry, said process comprising the steps of:

identifying a stroke input signal representative of one of five predefined stroke categories, said stroke input signal being associated with a predefined motion of a joystick used an input device coupled to a processor which is further coupled to a database and a display device;

20 as soon as a first stroke for a character is identified, displaying a first selection list in a selection list display area of the display device, said first selection list comprising ten most frequently used characters that start with said first stroke;

if the user chooses to enter any character from said first selection list, displaying said chosen character in a text display area of the display device; otherwise,

5 displaying a second selection list when a second stroke is identified, said second selection list comprising ten most frequently used characters that start with said first stroke followed by said second stroke;

if the user chooses to enter any character from said second selection list, displaying said chosen character in said text display area; otherwise,

10 displaying a third selection list when a third stroke is identified, said third selection list comprising ten most frequently used characters that start with said first stroke followed by said second stroke and then followed by said third stroke;

if the user chooses to enter any character in said third selection list, displaying said chosen character in said text display area; otherwise,

continuing to display a next selection list corresponding to a next stroke added until the user chooses to enter any character from said next selection list; and

15 repeating above steps for entering a next character.

37. The computer usable medium of Claim 36, wherein said five predefined stroke categories are horizontal stroke, vertical stroke, left falling stroke, right falling stroke, and any stroke other than the first four categories.

20 38. The computer usable medium of Claim 36, wherein said joystick comprises at least one motion representing a signal for selecting a character from any of said selection list.

39. The computer usable medium of Claim 36, wherein said joystick comprises at least one motion representing a signal for entering a chosen character into said text display area.

40. The computer usable medium of Claim 36, wherein said joystick comprises at least one motion representing a signal for deleting a character entered.

41. The computer usable medium of Claim 36, wherein said joystick enables the user to define at least one motion representing a task executable by the processor.

5 42. The computer usable medium of Claim 36, wherein said joystick is an isometric joystick.

43. The computer usable medium of Claim 36, further comprising the steps of:

10 moving a visual cue over a desired character in any of said selection list for selecting the desired character in response to a signal representing the user's action to select the desired character, said action to select being either a button pressing or a predefined motion of said joystick member; and

placing the selected character in said text display area in response to a signal representing the user's action to enter the selected character, said action to enter being either a button pressing or a predefined motion of said joystick member.

15 44. The computer usable medium of Claim 43, wherein said visual cue is a bitmap in any shape and in any size not larger than the space of a character displayed in said selection list display area.

45. The computer usable medium of Claim 43, further comprising the step of:

automatically selecting the first character in any of said selection list.

20 46. The computer usable medium of Claim 36, further comprising the step of:

displaying a default selection list before any stroke input signal is identified or after a punctuation mark or a character is entered, said default selection list comprising the first ten most frequently used characters.

47. The computer usable medium of Claim 46, wherein before any stroke signal is identified or after a punctuation mark is entered, further comprising the step of:

displaying said default selection list in a first default sequence which is based on frequency of each character in said default selection list being used as the first character of a sentence or half-sentence.

48. The computer usable medium of Claim 46, wherein immediately after a character is entered, further comprising the steps of:

appending each character in said default selection list to said entered character to make a two-character combination;

checking each two-character combination against the database;

if no word or phrase whose first two characters matches each two-character combination is found, displaying said default selection list in a second default sequence which is based on use frequency of each character in said default selection list; and

if some words or phrases whose first two characters matches said two-character combination are found, displaying said default selection list in a sequence determined by:

prioritizing a matching character whose corresponding two-character combination has matching words or phrases over a non-matching character whose corresponding two-character combination has no matching words or phrases;

prioritizing all matching characters based on use frequency of each corresponding matching word or phrase; and

prioritizing all non-matching characters based on use frequency of each non-matching character.

5 49. The computer usable medium of Claim 36, further comprising the steps of:

before any stroke input signal is identified or immediately after a punctuation mark is entered, displaying a first default selection list which includes the ten characters that are most frequently used as the first character of a sentence or a half-sentence in a sequence based on use frequency;

10 after a character is entered and before a next stroke input signal is identified, displaying a second default selection list which includes the first ten most frequently used characters, the sequence of which being based on:

use frequency of each character in the second default list, if no contextual relationship between the character entered and any character in the second default list
15 can be established, or

contextual association value of each character in the second default list.

50. The computer usable medium of Claim 36, wherein in response to a stroke input signal representing a stroke added, further comprising the steps of:

obtaining a character list comprising ten most frequently used characters that
20 satisfy the stroke ordinal number and the corresponding stroke category of said stroke added, and the stroke ordinal numbers and the corresponding stroke categories of all strokes previously added;

appending each character in said character list to the last character entered to make a two-character combination;

checking each two-character combination against said at least one database;

5 if no word or phrase whose first two characters matches said two-character combination is found, displaying said character list as a selection list in a sequence based on use frequency of each character in said character list; and

if some words or phrases whose first two characters matches said two-character combination are found, displaying said character list as a selection list in a sequence determined by:

10 prioritizing a matching character whose corresponding two-character combination has matching words or phrases over a non-matching character whose corresponding two-character combination has no matching words or phrases;

prioritizing all matching characters based on use frequency of each corresponding matching word or phrase; and

15 prioritizing all non-matching characters based on use frequency of each non-matching character.

51. The computer usable medium of Claim 36, further comprising the steps of:

20 concurrently with a stroke input signal being identified, displaying a numeric or iconic representation of the stroke represented by said stroke input signal; and

concurrently with a character being entered in said text display area, displaying a numeric or iconic representation of said character entered.